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U. S. DEPARTMENT OF AGRICULTURE  
**Canker-Rots in Southern  
Hardwoods**

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Canker-rot fungi cause serious cull in southern hardwoods, especially the red oaks. They do most of their damage by rotting the heartwood, but they also kill the cambium and rot the sapwood, often for considerable distances above and below the point where they enter the tree. It is their ability to form cankers on the outside of the tree that distinguishes these fungi from numerous others that are restricted to the heartwood.

Three fungus species, two in the family Polyporaceae and one in the Hydnaceae, are chiefly responsible for canker-rot. They occur throughout the South and in other regions.

### Importance

While the canker-rots are most important on the red oaks, they also occur on some of the white oaks and on hickory, honeylocust, and other species.

Hispidus canker, caused by *Polyporus hispidus*, is most prevalent on willow oak and water oak in the bottom lands but occurs occasionally on white oaks and hickory. Spiculosa canker, caused by *Poria spiculosa*, is most common on willow oak, water oak, and honeylocust in the bottom lands, and on hickory in the uplands. A similar canker caused by *Poria laevigata* is found

on bottom-land red oaks. *Irpex* canker, caused by *Irpex mollis*, most often attacks red oaks in both bottom and upland areas.

The prevalence of these canker diseases varies from place to place. In hardwood areas of the Piedmont of North and South Carolina and Georgia, hispidus cankers were found on 3.4 percent of the red oaks and 0.4 percent of the white oaks. In a bottom-land area of over 2,000 acres in Mississippi, 13 percent of the willow oaks and 3 percent of the Nuttall oaks were found to have hispidus cankers. The total loss from cankers and rot was 4 percent of the cubic volume. The cankers were lengthening at a rate of 0.5 foot per year. The length of visible heart rot exceeded canker length by an average of 2.4 feet.

Spiculosa cankers are not so common as hispidus cankers, but in some areas up to 10 percent of the bottom-land red oaks are infected. The rot behind spiculosa cankers increases in length at a rate of about 10 inches per year. In the Piedmont area spiculosa cankers were found on 8.1 percent of the hickories and 7.7 percent of the red oaks.

The rate of decay under *Irpex* cankers is unknown, but rot extends up and down from some cankers as much as 8 feet.

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Figure 1.—Hispidus canker and conk on a Nuttall oak. As the cross-section shows, the heartwood is rotten.

## Life History and Habits

Like most wood-rotting fungi, those causing canker diseases reproduce from microscopic spores. The spores are widely distributed by the wind, and those that lodge in wounds may germinate and start new infections. Canker-rot fungi enter mostly through the stubs of dead branches. They work down these stubs into the heartwood and also spread out from the point of entry, killing the cambium and forming progressively enlarging cankers.

Hispidus cankers (fig. 1) are often large and conspicuous. When the cambium dies a callus fold forms around it, but is killed in 3 or 4 years by the outward spread of the fungus. As additional callus folds are formed and killed, the tree frequently develops a spindle-shaped swelling that increases in size as time goes on. The central part of the infected region is sunken and covered with bark. The remnant of an old branch stub, usually less than 1 inch in diameter, can almost always be found near the center of the canker. On young cankers the branch stub itself is often present.

Hispidus conks are large, 2 inches or more in width, spongy, hairy, and without a stalk. Their upper surface is yellowish brown to rusty red. The lower surface has small round pores. The conks form in autumn and early winter, and after a few months dry to a rigid black mass and fall to the ground. Behind the cankers the entire heartwood is decayed. The decay is of the delignifying white-rot type, the wood becoming soft and straw-colored to pale yellow.

Spiculosa cankers (fig. 2) appear as rough circular swellings on the bole, usually with depressed centers. Evidence of an old branch stub generally can be found in the center of the canker, but the branch wood will have been replaced by brown, sterile





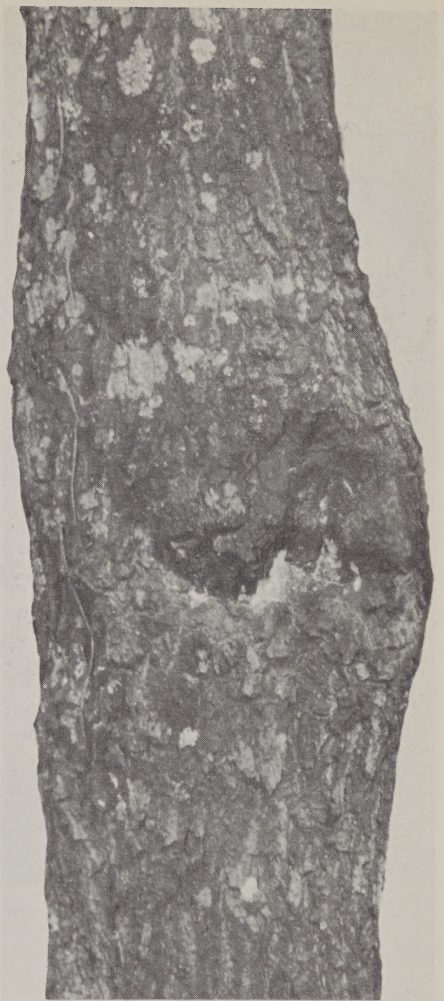
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Figure 2.—Spiculosa canker on a young willow oak. The decayed heartwood behind spiculosa cankers resembles that behind hispidus cankers.

fungus material. Although the cankers are small, the infected branch traces are much more swollen than uninfected ones. Conks ordinarily do not grow on living infected trees, but develop on well-decayed logs or snags. They grow flat under the bark of the dead tree and, as they develop, push off the bark to expose the brown fruiting surface.

Doubtful spiculosa infections can be identified by chopping into the center of the suspected branch trace. If infection is well established, the brown fungus material will be revealed by the ax-cut. The entire heartwood behind the canker always shows white rot.

Irpex cankers (fig. 3) are more irregular in shape than the other two kinds. They usually have a branch stub at or near the center, and a number of sunken areas on the swollen part. Conks and white

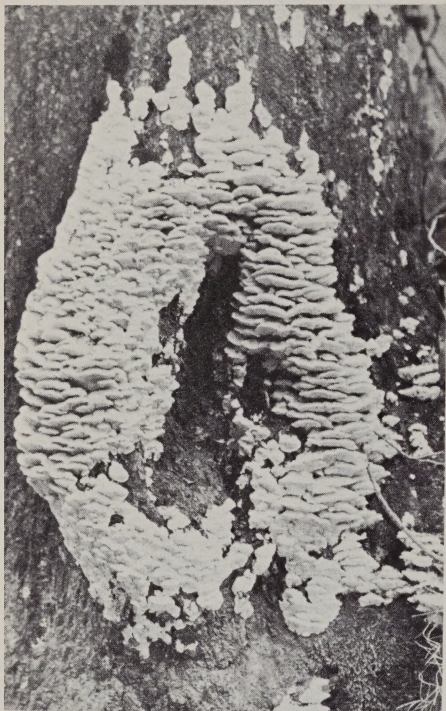


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Figure 3.—Irpex canker on willow oak.



fungus material often occur at the base of the sunken areas (fig. 4). The conks characteristically are small and creamy white; they have short, jagged teeth on the lower sur-



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Figure 4.—Irpex conks.

face. Irpex cankers are usually smaller than hispidus cankers, but some up to 2 feet long have been found. There is always white rot in the heartwood behind these cankers.

## Control

There is no practical method of preventing infections by canker-rot fungi. The infections develop so rapidly that they quickly convert trees into rotten culls. A cankered tree should therefore be cut as soon as possible to salvage what is usable and to provide growing space for sound trees.

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